

Evolution of Life

The fossil record indicates that about 3.5 billion years ago the first known life forms evolved. These organisms were:

- **single celled**
- **looked like modern bacteria**
- **anaerobic**
- **prokaryotic**

Characteristics of Prokaryotic cells

- **Always unicellular**
- **Lack a nucleus**
- **Lack membrane bound organelles**
- **Smaller size and simple**
- **Divide by binary fission**
- **DNA floats in cytoplasm**
- **Only Bacteria**

Evolution of Life

- About 2.2 billion years ago, photosynthetic bacteria evolved and began to pump oxygen into the oceans.
- As a result oxygen gas accumulated in the atmosphere.
- The presence of oxygen caused some life forms to become extinct and others to evolve.

The Origin of Eukaryotic Cells

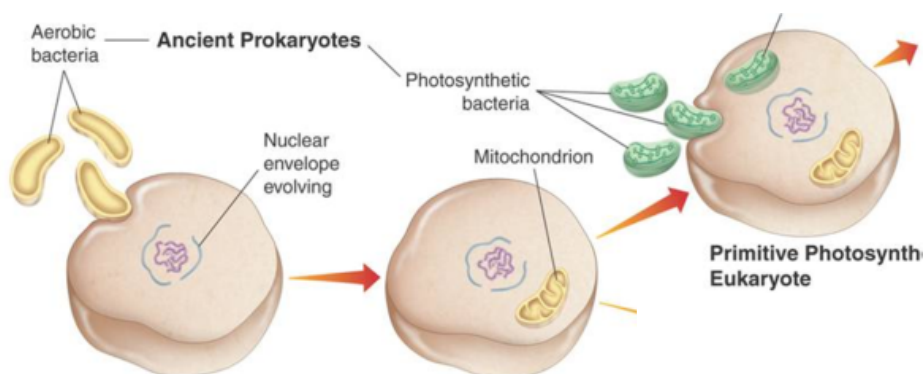
- About 2 billion years ago, prokaryotic cells began evolving internal cell membranes.
- The result was the ancestor of all eukaryotic cells.

Characteristics of Eukaryotic Cells

- Have a nucleus with DNA
- Larger size and more complex
- Divide by Mitosis
- Kingdoms: animal, plant, fungi, protista
- Usually multicellular some are unicellular.
- Have membrane bound organelles

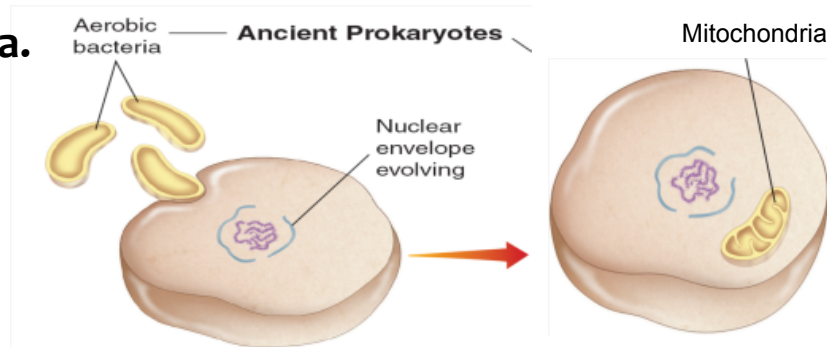
Origin of Eukaryotic Cells

The Endosymbiotic Theory proposes that eukaryotic cells arise from the symbiotic relationship formed by several different prokaryotic organisms



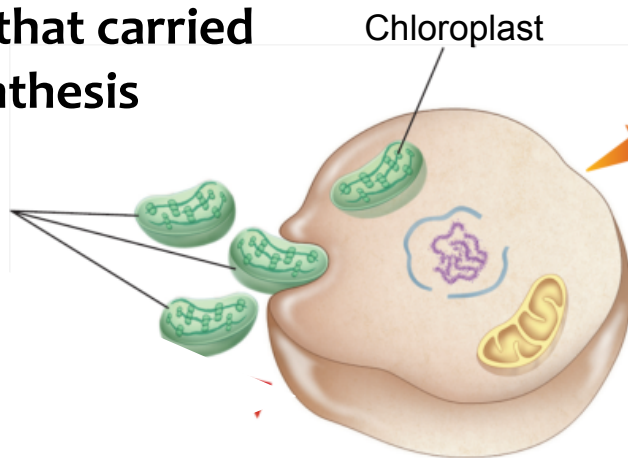
The Origin of Eukaryotic Cells

Prokaryotic cells that used oxygen to generate energy-rich molecules of ATP evolved into mitochondria.



The Origin of Eukaryotic Cells

Prokaryotes that carried out photosynthesis evolved into chloroplasts



No Nucleus	Fungi	Membrane bound organelles	Protists	Bacteria	DNA
	Animals		Has Nucleus	Plants	
Cytoplasm					Cell Membrane

